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LOOKOUT TRAINING HANDBOOK

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Naval Education And Training Program Management Support Activity

LOOKOUT TRAINING HANDBOOK

NAVEDTRA 12968

1991 Edition Prepared by
BMC Walter B. Fillingane

LOOKOUT TRAINING HANDBOOK

In this United States Navy with its nuclear-powered warships, computerized guidance systems, and the most accurate search radars in the world, you, the lookout, play a critical role in safe ship operations. Your trained human eye is far superior to the most sophisticated equipment. As a lookout, your eyes are the eyes of the ship, and on your alertness and skill rest the safety of the ship.

In the naval service there is probably no Rule of the Road more conscientiously observed than Rule 5 of the *Navigation Rules*, Commandant Instruction M16672.2A, which states:

> Every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision.

In this manual, we will discuss visual search and contact reporting procedures; ship/aircraft recognition; Rules of the Road; buoy systems; special sea detail; restricted visibility steaming; and man-overboard procedures, along with other material which will assist you in your capacity as a lookout.

THE LOOKOUT

A lookout is a person detailed to observe everything within an assigned sector and to report everything seen in or heard from that sector to the officer of the deck (OOD) and the combat information center (CIC) watch officer. The safety and efficiency of the ship depend to a great degree on the alertness and effectiveness of lookouts.

Lookouts on watch are under the direct supervision of the OOD. However, the OOD will usually delegate this authority to the boatswain's mate of the watch (BMOW). The BMOW assigns the lookouts to their stations, making sure they are properly instructed, clothed, equipped, and relieved. Lookouts are trained in their duties by the CIC officer.

The chances are great that the lookout will be the first to observe danger. A faint wisp of smoke on the horizon may be the first indication of an approaching enemy surface unit. A single flash of sunlight on a wingtip may be the only notice of approaching enemy aircraft that can attack at a speed of 500 yards per second. A split-second glimpse of a periscope may be the only warning of an impending submarine attack. Failure to see a mere pinpoint of light on the horizon may mean that a buoy has been missed and a ship grounded.

LOOKOUT STATIONS

Lookouts man stations as assigned by the OOD and perform duties under the ship's lookout doctrine. The number of stations vary according to the type of ship and whether in peacetime or wartime. Large ships usually have more lookout stations than smaller ships. More lookouts are required in wartime than in

peacetime. When the required number of people is available in peacetime—and always in wartime—three basic types of lookout watches are established. They are (1) surface lookouts who search from the ship to the horizon, (2) low-sky lookouts who search from the horizon to 5° above it, and (3) high-sky lookouts who search from the horizon to the zenith (directly overhead). Additionally, several people may be assigned to each search, each person being responsible for a specified sector. Adjacent sectors have about a 10° overlap, so no area will go unsearched.

The normal peacetime lookout organization has three people in each watch section. Two persons are located on the bridge or atop the pilothouse; one searches to port, the other to starboard. Their sectors extend from just abaft the beam forward to dead ahead. The third person is stationed aft and is called the after lookout or life-buoy watch and is responsible for the sector extending from the starboard beam aft and around to the port beam (figure 1). In addition

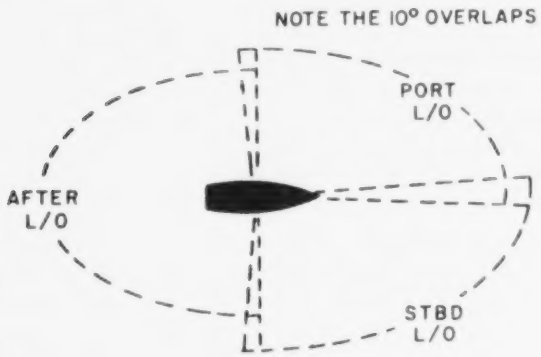

Figure 1.—Sectors assigned.

to reporting all objects behind the ship, the after lookout is responsible for throwing overboard a lifebuoy promptly when a person falls over the side.

When you are on lookout watch, always report everything you see or hear. Trash in the water may seem unimportant to you, but it may indicate a vessel has passed that way. In wartime, such a disclosure could lead to the sinking of the vessel. Discolored water may mean the ship is entering a shoal area. The OOD will never reprimand you for reporting objects, but you will surely be reprimanded if you do not report them. Never let the OOD spot something before you do.

A special watch, called the fog lookout, is stationed as far forward in the ship as possible during fog or other conditions of poor visibility. The fog lookout watch consists of two people. One person wears sound-powered (S/P) phones for communication with the bridge; the other looks and listens.

You often can hear sounds at night without seeing their source. Usually you can determine the bearing of the sound and, sometimes, an estimate of its distance. When in a fog, however, sound sources are difficult to determine, because the sound may seem to come from several different directions. For this reason you must be especially vigilant in fog. Report all sounds, and do your utmost to determine their direction.

Lookout Duties and Responsibilities

As a lookout, your primary responsibility is sighting, identifying, and accurately reporting to the responsible authority all objects. To carry out this responsibility effectively, you must do the following:

1. Use correct scanning procedures.
2. Sight and report everything observed in your sector. A normal tendency is to hesitate until you are

certain an actual contact has been sighted. Do not hesitate. Many important sightings have been made on hunches. Everything, including previously sighted objects, should be reported when it enters your sector unless it is an object which you have been specifically ordered not to report.

3. Estimate relative bearing, range, position angle, and target angle.

4. Handle and care for binoculars properly and use them wisely.

5. Send accurate reports of all visual information to the bridge and combat information center (CIC) as rapidly as you can.

6. Use correct procedures during restricted-visibility conditions caused by fog, rain, snow, and so forth.

Many electronic devices are now in use for detecting and locating the enemy and as aids in navigating. These delicate instruments, however, can malfunction. They are not infallible. Under some conditions they are turned off entirely so your ship cannot be detected by the enemy. The availability of these devices in no way relieves you of your responsibility to see everything in your sector within range of vision and to report everything you see. Remember, the safety of the ship is dependent on the eyes of one or more human beings.

LOOKOUT EQUIPMENT

Proper equipment for a lookout includes sound-powered (S/P) telephones, binoculars, binocular filters, sunglasses, dark adaptation goggles, and various articles of foul-weather gear.

SOUND-POWERED TELEPHONES

Sound-powered (battle) telephones are just what their name implies; instead of a battery or generator, the voice provides the power for the circuit. Failure of the electrical power system has no effect upon the sound-powered phones although one or more stations can be knocked out by damage to the circuit. Every sound-powered phone receiver is also a transmitter, and vice versa. In other words, if one earpiece on a sound-powered headset is inoperative, you normally can continue to both talk and receive through the other earpiece. The same holds true for the mouthpiece.

The primary battle sound-powered telephone circuits provide communication between selected battle stations grouped on established circuits. No dialing is necessary. When you plug into one of these circuits, you can immediately communicate with anyone who is plugged in on the same circuit. Additional stations not on the circuit may be cut in or cut out by a switchboard.

That there may be a number of stations on the same circuit indicates the importance of strict compliance with standard telephone talker procedures and terminology. The duties of a telephone talker and procedures employed when a sound-powered telephone is used are covered both in *Basic Military Requirements*, NAVEDTRA 10054-F, and *Sound-Powered Telephone Talkers' Manual*, NAVPERS 14005-A.

JL is the designation given to the circuit over which the lookouts report. It is an important channel of vital information to the bridge, CIC, and gun control. In wartime the JL circuit is manned under all cruising conditions. In peacetime it is manned when circumstances require extra lookout precautions, but it may then be combined with other circuits.

BINOCULARS

The most commonly used optical equipment is a set of binoculars (figure 2). The size of binoculars deemed most useful for marine work is 7 × 50; that means the glasses have a magnification of 7 power and an objective lens 50 mm in diameter. This ratio of magnification is a satisfying compromise between the need for magnification and the reduction of angle, or field of view, that results as the magnification is increased. Large objective lenses have excellent light-gathering characteristics, making them particularly suitable for night use.

Adjustments

To gain maximum benefit from the light-gathering quality of binoculars, you must adjust the binoculars

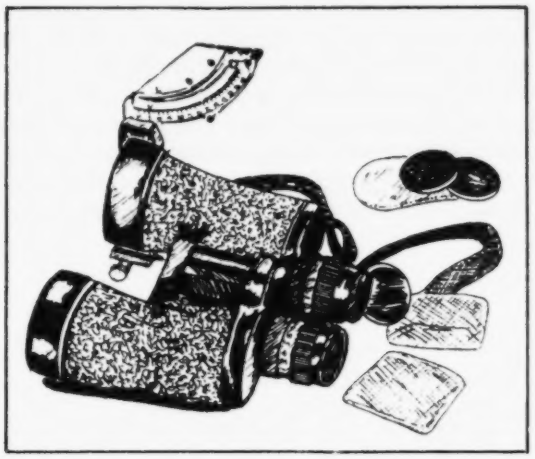

Figure 2.—7 × 50 binoculars.

to obtain proper focus and correct distance between lenses.

To obtain proper focus, observe the following steps:

1. Set both eyepieces to the +4 mark.
2. Place the binoculars firmly against the eyebrows and locate a small, well-defined object about 1/2-mile distant.
3. Cover one lens (do not touch the glass).
4. Slowly turn the other eyepiece until you see a sharp image, then back off as far as possible without losing the sharpness. (Keep both eyes open; closing one will give an incorrect focus.)
5. Note the reading on the scale, then repeat the above procedure two or three times to obtain the exact setting.
6. Follow the same procedure for the opposite eye.

The final adjustment is to establish the interpupillary distance (IPD), which is the distance between your eyes. Move the barrels up and down until you see a single circle, as shown in figure 3, then note the reading on the IPD vernier between the barrels. An incorrect IPD setting will strain the eyes and waste part of the binoculars' light-gathering ability.

You will not have your own personal binoculars—they are passed from watch to watch—so it is important

Figure 3.—Proper IPD setting.

that you know your focus and IPD settings so that the binoculars may be properly adjusted at night or when there are no objects on which to focus in the daytime. For nighttime use, the focus setting is one mark less than for daytime.

Use

Contrary to widespread opinion, it is not always better to search with binoculars instead of using the naked eye. Several factors govern when and how binoculars should be used. In fog, for instance, they should be used only to identify a previously sighted contact; at night, they should be used quite often.

Daytime use of binoculars depends upon the type of search being conducted. Surface lookouts should use them to scan across their sector, then use the naked eye on return sweeps. Sky lookouts should use them only to identify a target detected with the naked eye.

At night the binoculars should be used more frequently than during daylight, but searches should still be made with the naked eye. You often can see objects, particularly moving ones, out of the corner of your eye, whereas they might not be detected with the binoculars because of their narrow field of view.

Binoculars should never be used to scan in fog, rain, snow, or thick haze, but may be used to identify a contact detected by the naked eye.

Care

Binoculars are fairly delicate instruments; they cannot stand much knocking about. Therefore, keep them on a short strap when wearing them to prevent their banging against solid objects. Keep the lenses dry, otherwise you will not be able to see properly. Do not let them become overheated; the cement around the

lenses may melt, allowing moisture to cause the lenses to fog or bubble.

Above all, keep them clean. You must be careful, however, not to damage the lenses. First, blow off loose dust, then breathe on the lenses (except in freezing weather), and gently clean them with lens paper. Rags, plain paper, handkerchiefs, or your sleeve or shirttail should not be used, as they might scratch the lens.

VISUAL SEARCH PROCEDURES

Effective visual searching does not come naturally; a lookout must learn through practice. In the daytime a person's eyes must stop on an object in order to see it. Try moving your eyes across the water rapidly from object to object and note that as long as your eyes are in motion, you see almost nothing. Now allow your eyes to move in short steps from object to object and you can really see what is there.

This is known as the step-by-step method. (See figure 4.)

A ship's lookouts cannot be too well-trained, too alert, or too much on the job. Remember—the safety of the ship and the personnel on board depend on the lookout. By seeing things and reporting them quickly

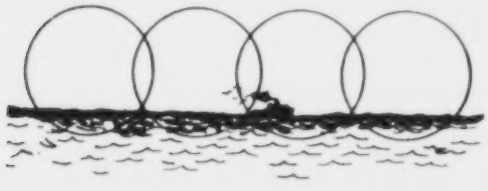

Figure 4.—Scanning, using the step-by-step method.

and accurately, you might prevent the crew's having to swim the cold waters of the North Atlantic or the shark-infested waters of the South Pacific. The key phrase for all lookouts is BE ALERT!!

In good weather, well-trained lookouts can easily spot planes at 15 miles with the naked eye. With binoculars, and in unusually clear weather, lookouts have detected planes at 50 miles. At night skilled lookouts can detect objects that the untrained lookout would never suspect were there.

SURFACE SEARCHING

Surface lookouts scan the water from the ship to the horizon and are responsible for all contacts in their sector. In searching the assigned sector, always start at the forward part of the sector and search aft. (See figure 5.) To search and scan, hold the binoculars steady so the horizon is in the top third of the field of vision. Direct the eyes just below the horizon and

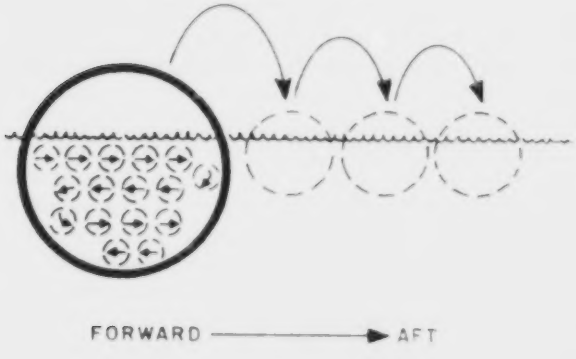

Figure 5.—Surface searching.

scan for 5 seconds in as many small steps as possible across the field seen through the binoculars. Search the entire sector in 5° steps, pausing between steps for approximately 5 seconds to scan the field of view. At the end of your sector, lower the glasses and rest the eyes for a few seconds, then search back across the sector with the naked eye.

When you sight a contact, keep it in the binoculars' field of vision, moving your eyes from it only long enough to determine the relative bearing.

SKY SEARCHING

Sky lookouts scan from the horizon to the zenith, aided only by sunglasses for protection from glare.

Binoculars should only be used when needed to identify a contact that has been sighted with the naked eye.

Scanning of the assigned sector should be accomplished by moving the eyes in quick steps (about 5°) across the sector just above the horizon. Shift the eyes upward about 10° and move them back in quick steps, continuing this type of search from horizon to zenith. (See figure 6.) When the zenith is reached, rest your eyes by blinking them for a few seconds, then start over.

DARK ADAPTATION

If you were to go on night watch directly from a lighted compartment, you would be almost blind for a few minutes. This reaction is similar to that you experience when you walk from a lighted theater lobby into a darkened theater. As your eyes become accustomed to the weak light, your vision gradually improves. After 10 minutes you can see fairly well. After 30 minutes you reach your best night vision. This

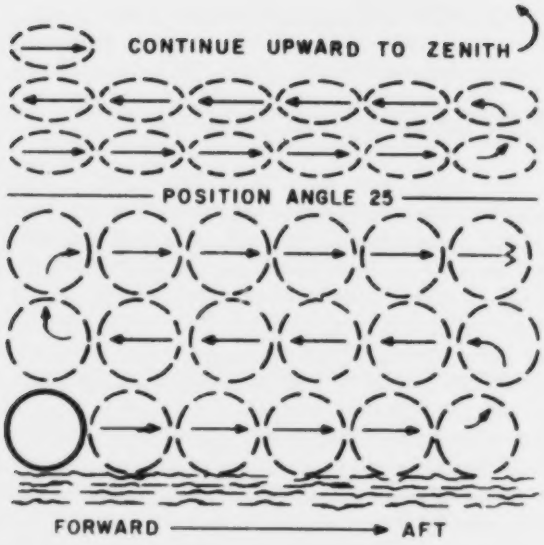

Figure 6.—Sky searching.

improvement of vision in dim light is called dark adaptation.

Effective dark adaptation must be planned well in advance. Exposure to excessive glare during the day will hamper the ability of the eyes to adapt to the dark at night. This effect may last for several days if the exposure has been severe; therefore, lookouts scheduled for night watches should wear sunglasses as much as possible in the daytime.

Dark adaptation before going on watch consists of spending at least 30 minutes in darkness or with the eyes protected by red goggles. Wearing red goggles is effective because red light does not affect the eyes. To

complete adaptation for a night watch, spend 5 minutes on deck before relieving the watch. These 5 minutes allow the eyes to adjust to the amount of illumination in which they will work.

NIGHT LOOKOUT TECHNIQUES

Dark adaptation alone is not sufficient to ensure the highest visual keenness in the dark. Learning to use the eyes at night is like learning to use a precision instrument; you must practice to acquire the needed ability. In night lookout work, don't sweep the sky or horizon with the eyes. The eyes do not see well when they are moving. Scan the horizon in a series of movements which will allow your eyes to come to periodic rests as they scan the sector. When you are using night eyes, always look a little to one side and out of the corners of your eyes. Pay attention to the things on the outer edges of your field of vision. A faint object may not be recognizable until your gaze has been directed toward it a number of times. Likewise, direct your eyes slightly above or below the horizon, as there are times when you cannot see the actual horizon unless your line of vision is purposely elevated or depressed.

One of the greatest aids to night vision is contrast between object and background. Therefore, a good technique is to concentrate on the point where the sky appears to meet the water. Here objects may loom above the darker water and be seen against the lighter sky.

To summarize dark adaptation and night lookout techniques, remember these things:

1. Protect your eyes from light before going on night duty and while you are out.
2. Don't look directly at any light or illuminated object.

3. Use the corners of your eyes.

4. Keep your eyes moving. Quick short movements and short pauses are better than long sweeping movements and long pauses.

5. Practice what you know about seeing at night until it becomes second nature for you to use your eyes to their best advantage.

CONTACT REPORTING PROCEDURES

Lookouts supplement the information received from radar and other electronic equipment to provide a clearer and more complete picture of the air and surface situations. Visual sightings are the only means available to guard against contacts slipping in through blindspots and holes in the radar coverage. Many times the ship will be operating under electronic silence conditions and must depend entirely on your information.

Always report everything you see, hear, or believe you see or hear. By reporting doubtful targets, more eyes are brought to bear on them, resulting in improved chances of identification. At night and in poor visibility, report even the faintest hunches. At such times, a hunch that you have seen something often means you really have. Do not delay the report while you try to get a better look—the main thing is speed.

INITIAL REPORT

Give the initial report when you first sight a contact. Usually the contact is too far away for a positive

identification, but do not delay the report. Include in the initial report:

1. WHAT YOU SEE: Describe the contact quickly and briefly. Name the type or class of ship or aircraft if you recognize it; otherwise, simply report "ship," "plane," and so forth.

2. BEARING: Always report contacts in relative bearings. These are given as three digits, spoken digit by digit.

3. RANGE: Ranges are reported in yards/miles and spoken digit by digit, except that multiples of hundreds and thousands are spoken as such.

4. TARGET ANGLE: Report target angle on all ships. It will be given in three digits, spoken digit by digit.

5. POSITION ANGLE: Report position angle on all aircraft. It will be given in one or two digits, spoken as a whole, not digit by digit.

6. MOVEMENT: Report whether the contact is moving from right to left, left to right, opening, closing, paralleling, high speed, slow speed, dead in the water, and so forth.

Bearings

The direction of an object from a ship is called the bearing. Bearing is measured in degrees clockwise around a circle, from 000° to 360°. Relative bearings have the ship's bow as a reference point; true bearings use true, or geographic north, as a reference point;

magnetic bearings use the magnetic North Pole as their reference point. All three types of bearings may sometimes coincide, but such a situation is rare and of a temporary nature. Lookouts report objects in degrees of relative bearing.

Figure 7 shows the relative bearings around a ship. An object dead ahead is bearing 000°; one on the starboard beam is at 090°, and so on. Study the illustration. Practice pointing to various objects and compare your estimates of their bearing to what they really are. With practice you will be able to report a contact within 10° of its actual bearing.

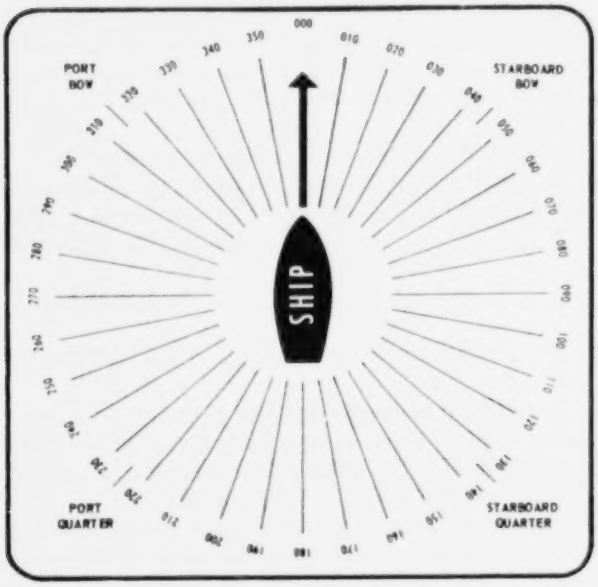

Figure 7.—Relative bearings.

To prevent confusion, the Navy has established a definite procedure for reporting bearings, ranges, and so forth. The accompanying list shows how numerals are to be spoken.

Numeral	Pronounced
0	ZE-RO
1	WUN
2	TOO
3	TREE
4	FOW-ER
5	FIFE
6	SIX
7	SEV-EN
8	AIT
9	NIN-ER

Bearings are always reported in three digits, and spoken digit by digit, except that objects dead ahead or astern (000°, 180°); on either beam (090°, 270°); or on either bow (045°, 315°) or quarter (135°, 225°) may be indicated as such. For example, a ship bearing 315° could be reported as being broad on the port bow, although the bearing itself can be used.

Do not become excited and neglect to report the bearing. If you say, "There's a periscope ahead," when

it actually is to one side, valuable time can be lost while the OOD tries to spot it. But if you say, "Periscope bearing Tree Fife Ze-ro," the OOD will have no difficulty determining in which direction to look. Note that the word "relative" was not included in our sample report. It is understood that lookouts report only relative bearings.

Position Angle

Position angle is the angle, measured in degrees, between the line of sight to the horizon and the line of sight to the detected aircraft. The OOD does not have time to search from the horizon (0°) to the zenith (directly overhead—90°) for a contact reported without a given position angle. A position angle will quickly locate the target for the OOD and the antiaircraft gun directors.

Position angles should be given on all aircraft in one or two digits and spoken as a whole, not digit by digit. The reference "position angle" is always spoken before the numerals.

Position Angle	Spoken
0	Position angle Ze-ro
5	Position angle Fife
15	Position angle Fifteen
27	Position angle Twenty Sev-en
85	Position angle Eighty Fife
90	Position angle Ninety

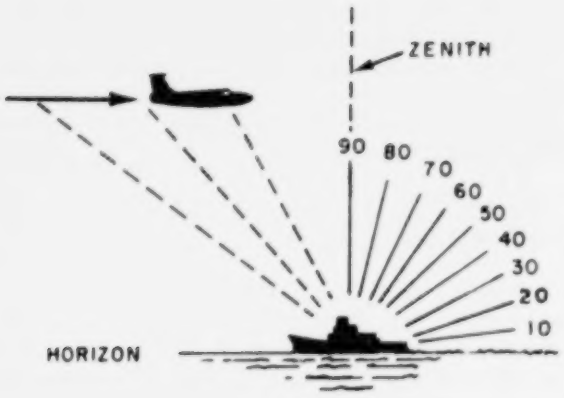

Figure 8.—Position angle.

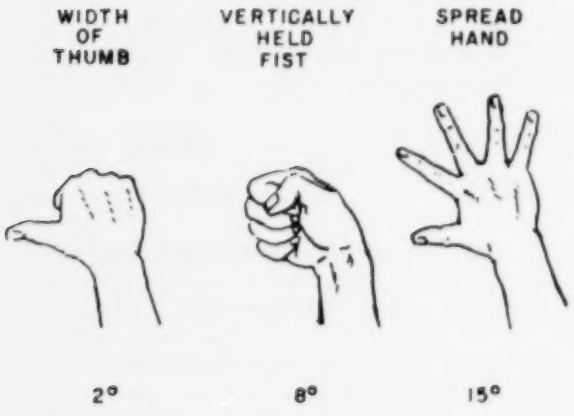

Figure 9.—Position angle aids.

As the aircraft shown in figure 8 approaches the ship, the position angle increases. Inform all stations when the angle changes more than 20°. Use the aids shown in figure 9 to help you more accurately determine an aircraft's position angle.

Target Angle

Target angle is the relative bearing of your ship from another ship. You may wonder why you should care what your ship bears from another ship, but it can be of great help to the OOD if you include target angle in your report.

The OOD uses target angle as an aid in determining the course of action to take when another ship is encountered. Target angle is also useful in gunnery and antisubmarine operations. Assume that you are the starboard lookout and you detect a ship on your starboard bow heading at right angles across your course (figure 10). You report to the OOD

SHIP BROAD ON THE STARBOARD BOW (OR 045°)—TARGET ANGLE 315.

Assuming your course to be due north, the OOD knows the other ship's course is due west. Depending on the speeds of the two ships, if they continue on their present course, a collision may result. Under the International Rules of the Road, this condition is known as a crossing situation, and in a crossing situation the ship to port is the give-way vessel and must keep clear of the other (stand-on) vessel. Your target angle report has alerted the OOD that a change of course or speed, or both, may be needed and there is now time in which to plan appropriate actions. A

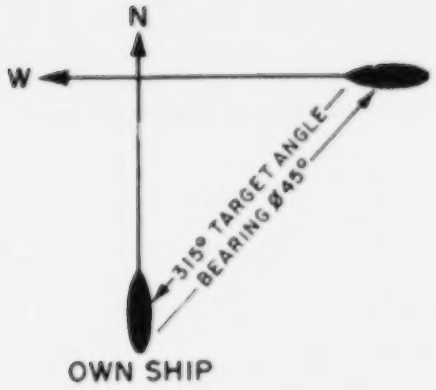

Figure 10.—Target angle.

change in target angle means that the target has changed course. Following are some examples of initial reports:

BRIDGE—PORT LOOKOUT—SURFACE CONTACT BEARING TWO EIGHT ZERO—TWO THOUSAND YARDS—TARGET ANGLE ZERO NINER ZERO—MOVING FROM LEFT TO RIGHT SLOWLY.

BRIDGE—STARBOARD LOOKOUT—DESTROYER BEARING ONE ZERO ZERO—SIX MILES—TARGET ANGLE ZERO ONE ZERO—CLOSING RAPIDLY.

BRIDGE—STARBOARD LOOKOUT—F-14 JET FIGHTER BEARING ZERO FOUR ZERO—POSITION ANGLE THIRTY THREE—MOVING FROM RIGHT TO LEFT VERY RAPIDLY.

AMPLIFYING REPORT

An amplifying report is made when any change occurs or more accuracy can be given to a previous report. Such cases include

- when the ship or aircraft alters course or changes speed. These changes can be detected by the human eye much faster than with electronic devices.

- when a more positive identification can be made. You can now see what the nationality of the ship is, or its hull number, or other identifying features.

- when anything unusual occurs. A ship may sound its whistle, make smoke, drop the anchor, display additional lights, and so forth.

Range Estimation

A range in yards for each contact reported would be invaluable, but estimating ranges over water is very difficult for the inexperienced lookout because distances are deceptive. Only with a lot of on-the-job experience will you become proficient in estimating ranges to contacts. Question CIC concerning the radar ranges to visual contacts and compare them with your estimated range.

The only readily available reference point you can use when estimating ranges is the horizon. Knowing your height above the waterline will help you estimate ranges because the distance to the horizon varies with the height of the eye.

(See figure 11.) At a height of 50 feet, for example, the distance to the horizon is about 16,000 yards (8 miles); at a height of 100 feet, the distance is about 23,000 yards (11-1/2 miles). Practice estimating ranges to other vessels in company whose distances are known or can be easily determined. If your ship does much formation steaming, you will become pretty good at judging distances such as 500, 1,000, and 2,000 yards. Until you become proficient at estimating distances, use such phrases as "close aboard," "on the horizon," "hull down," and so forth. (See figure 12.)

HULL UP —The ship is in from the horizon.

HULL DOWN —The ship is over the horizon. Only a part of the superstructure can be seen, but the hull is not yet visible on the horizon.

ON THE HORIZON —The waterline of the ship's hull appears to be on or near the horizon.

CLOSE ABOARD —The contact reported is extremely close to own ship.

In addition to ranges and range references given, any geographic references available can be used to aid the bridge and CIC in locating the ship sighted. Fixed objects such as buoys, small islands, coves, bridges,

HEIGHT OF EYE FEET	RANGE TO HORIZON YARDS	MILES
10	7,200	3.6
20	10,200	5.1
30	12,600	6.3
40	14,400	7.2
60	17,800	8.9
80	20,600	10.3
100	23,000	11.5

Figure 11.—Range height table.

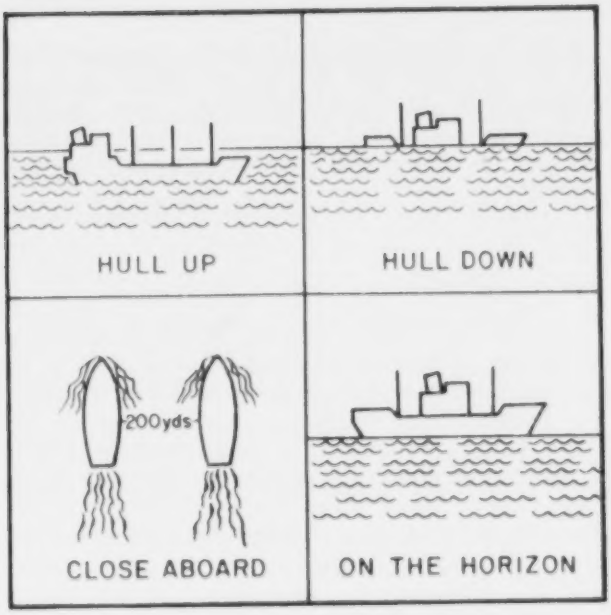

Figure 12.—Range supplements.

and piers are helpful in referring to a contact's location. Here are some examples:

2500 YARDS—VERY CLOSE AND TO THE RIGHT OF RED BELL BUOY NUMBER 4.

4 MILES—PASSING THROUGH THE BRIDGE OPENING AT THIS TIME

6 MILES—ABOUT 500 YARDS TO THE LEFT OF THAT EARLIER REPORTED DESTROYER

NOTE: Though ranges are given and reported in yards/miles, it is also in your interest to learn to convert these distances to the metric system; that is, meters/kilometers. One meter equals approximately 1.1 yard; 1 kilometer (1,000 meters) equals approximately 0.6 mile.

Speed Estimation

Speeds can be either easy or difficult to estimate, depending on how far away the contact is. Just as references are needed for ranges, speed references are also needed. Knowing your own-ship's speed at all times can be a valuable aid in estimating other ship's speeds. A question to ask yourself is "How fast is the ship going in relation to me?" If your ship is steaming at 10 knots and is overtaking a ship on your starboard side, steaming a few knots slower than you are, it is safe to estimate the other ship's speed at about 5 to 8 knots. If a ship on your port side is overtaking

you, steaming a few knots faster than you are, it is safe to estimate that the other ship's speed is about 12 to 15 knots.

A readily visible aid in estimating speed is a ship's bow wave and stern wake. A bow wave is the wave of water the bow of a ship makes as it travels through the water. As a ship travels faster, the bow wave becomes larger (figure 13). A stern wake is the phosphorus trail that a ship leaves as it travels through the water. Unlike the bow wave, it is a calm, white-colored water. As a ship travels fast, the stern wake increases in length; when the ship slows down, the stern wake decreases.

The bridge and CIC do not expect accurate, to-the-exact-knot speed reports from you. However, a good estimate is always valuable and can be used as a

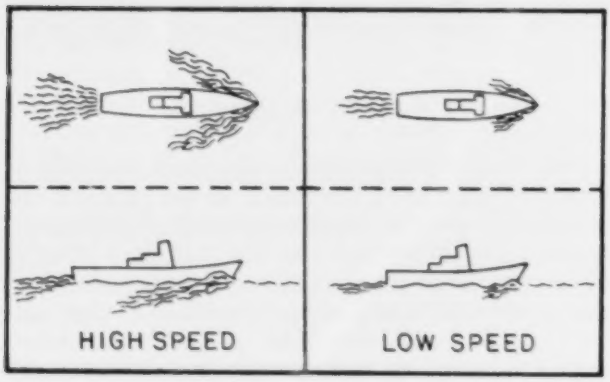

Figure 13.—Bow wave and stern wake.

reference for CIC's courses and speeds sent to the bridge. Use the following terms in reporting speeds:

High speed	25 knots or greater
Medium-high speed	20 to 24 knots
Medium speed	15 to 19 knots
Medium-low speed	10 to 14 knots
Low speed	9 knots or less
Dead in the water	Not moving

Increasing your skill at estimating ranges and speeds can only be done one way—by constant practice. An easy way to check your accuracy is by estimating a ship's range and speed, reporting it to all stations, and then asking CIC for its radar range and computed speed. CIC will be glad to help you develop your estimating skills because you are a part of the team.

MAN OVERBOARD

Man-overboard situations require extremely rapid action on the part of the officer of the deck and all assistants. Consider yourself one of these assistants. Saving the life of a person who falls overboard depends on the speed with which reports are made and rescue action taken. How long can a person fully clothed and without a life jacket stay in the water without drowning? The answer to that question is a difficult one because it depends on many factors. What is the sea state? How cold is the water? Is the person a good swimmer? The person has a good chance of being

recovered if the lookout knows exactly what to do and then does it without hesitation.

LIFE-BUOY WATCH

The life-buoy watch (usually the after lookout) is a special watch which carries the responsibility for detecting and reporting man-overboard incidents, providing a life ring to the person in the water, and marking the spot where the incident occurred. The number of persons assigned to this watch and the location of their stations will vary with different types of ships. For example, on most ships the life-buoy watch is assigned to the regular lookouts aft. The life-buoy watch area assigned to a particular lookout includes the decks of the ship and water area immediately around the ship. This area must be kept under constant surveillance to detect the first indication that a person has fallen overboard. Binoculars should be used only after initial detection of the person has been made. One earpiece of your sound-powered phone headset must be left off because the first indication of a person overboard may be a shout or a splash. During conditions of restricted visibility, this watch will be augmented by one person who will be the sound-powered phone talker.

LOOKOUT PROCEDURES

The life-buoy watch or anyone else who sees a person fall overboard must shout as loudly as possible, without hesitation, "MAN OVERBOARD, STARBOARD (PORT) SIDE." This call must be repeated until the conning officer takes necessary action or indicates in some way that the word has been received. A life ring with a small lighted buoy attached

(figure 14) and a smoke float (figure 15) should be thrown over on hearing "MAN OVERBOARD," regardless of whether or not the person is seen. When launching a Mk 6 smoke float, (1) remove the tape from over the pull ring, (2) pull the ring smartly from the

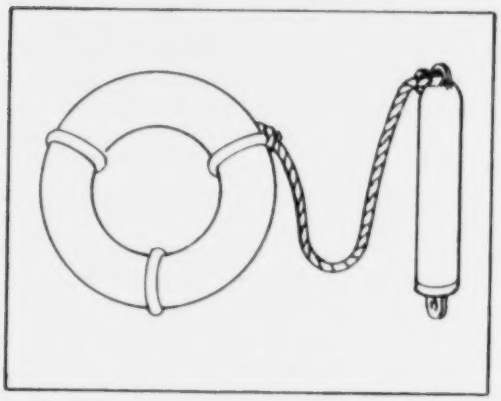

Figure 14.—Life ring and lighted buoy.

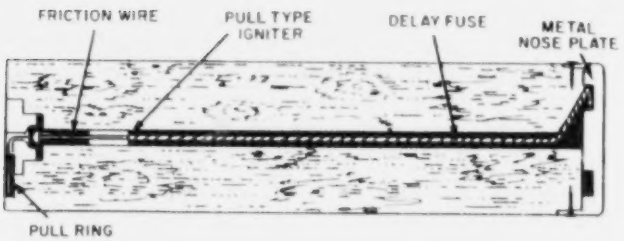

Figure 15.—Mk 6 smoke and illumination signal.

device, and (3) immediately throw the smoke float over the side. Do not remove the tape from over the pull ring until just before you launch the signal. This tape not only prevents an accidental pull on the tab ring, but also helps to protect the igniter assembly from moisture which might render the signal useless.

If the ship is fueling and highly volatile fuel such as gasoline or jet fuel is in the water, or if under darkened ship condition, do not use a smoke float or flare.

SHIP PROCEDURES

Every underway watch is organized to handle the man-overboard emergency. The officer of the deck, upon receipt of information of a man overboard, maneuvers the ship according to prescribed doctrine to reach a recovery position. The OOD has the following word passed twice: "MAN OVERBOARD PORT (STARBOARD) SIDE. SECTION(S) 1, (2, 3,) MAN THE RESCUE DETAIL." The OOD also announces whether the recovery will be made by boat or whether it is to be made with the ship. Further, the ship will sound six or more short blasts on the whistle and, by day, hoist flag OSCAR. By night (in peacetime) two pulsating red lights are displayed vertically or one white rocket (or one white marine illumination signal) is fired. In addition, the officer of the deck notifies the ships in company and the officer in tactical command (OTC) and informs the commanding officer, the executive officer, the navigator, and the flag duty officer when embarked. The OOD keeps the deck recovery detail informed of the recovery side of the ship. Searchlights must be used with care and only when directed by the OOD because premature use might impair the night vision of the OOD and the lookouts.

SPECIAL SIGNAL FLAGS

Special signal flags (figure 16) are used to attract attention to special operations or to request assistance. Frequently they imply the necessity to stand clear by an approaching vessel, so it is important to recognize and report them quickly.

Flags	Usage
BRAVO	Engaged in fueling, rearming, or handling dangerous cargo
FOXTROT	Indicates flight operations
HOTEL	Indicates helicopter operations
OSCAR	Indicates man overboard
FIVE	Indicates breakdown or a ship not under control

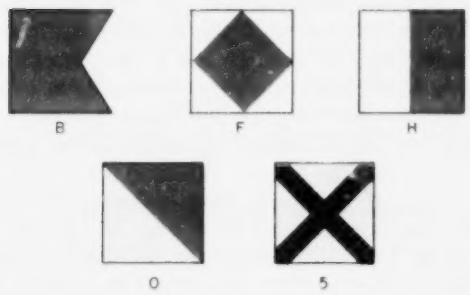

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Figure 16.—Special signal flags.

DISTRESS SIGNALS

Distress signals under both International and Inland Rules are as follows:

The following signals, used or exhibited either together or separately, indicate distress and need of assistance:

1. A gun or other explosive signal fired at intervals of about a minute
2. A continuous sounding with any fog-signalling apparatus
3. Rockets or shells, throwing red stars fired one at a time at short intervals
4. A signal made by light, radio, or by any other signalling method consisting of the group ···−−−··· (SOS) in the Morse code
5. A signal sent by radiotelephone consisting of the spoken word "Mayday"
6. The International Code Signal of distress indicated by N.C. (NOVEMBER CHARLIE)
7. A signal consisting of a square flag having above or below it a ball or anything resembling a ball
8. Flames on the vessel (as from a burning tar barrel, oil barrel, etc.)
9. A rocket parachute flare or a hand flare showing a red light
10. A smoke signal giving off orange-colored smoke
11. Slowly and repeatedly raising and lowering arms outstretched to each side
12. The radiotelegraph alarm signal
13. The radiotelephone alarm signal
14. Signals transmitted by emergency position-indicating radio beacons

In addition, Inland Rules stipulate that a high intensity white light flashing at regular intervals from 50 to 70 times a minute may be used. There is no basis in the Rules for the popular notion that our national ensign, hoisted upside down, is a recognized signal of distress. No man-of-war would ever subject the colors to that indignity. But if you should see a private craft with the ensign hoisted upside down, it may be in distress and you should report it without delay.

SPECIAL SUBMARINE SIGNALS

The following signals, though not part of the Rules of the Road, are prescribed for submerged submarines in emergency situations involving rising to periscope depth or surfacing.

1. A yellow smoke flare fired into the air from a submarine indicates that the submarine is coming to periscope depth to carry out surfacing procedures. Ships should clear the immediate vicinity, but should not stop propellers.
2. A red smoke flare fired into the air from a submarine is a signal that the submarine is in serious trouble and will surface immediately if possible. Smoke flares of any color, fired into the air at short intervals, mean that the submarine requires assistance. All ships in the vicinity should stand by to give aid.

RESTRICTED-VISIBILITY STEAMING

Restricted visibility is defined as anything that restricts regular visibility to a degree that endangers safe navigation. Many people think of restricted visibility as just fog, but restricted visibility can be caused by many other things; rain, smoke, heavy seas,

snow, and so forth. During periods of restricted visibility, the importance of the lookout's job increases. Now the lookout is not only the "eyes" but also the "ears" of the ship. The job now requires a special skill which must be based on a thorough knowledge of what to do and how to do it.

FOG LOOKOUTS

This watch is stationed during fog or conditions of reduced visibility. The watch is stood in those locations where approaching ships can best be seen or heard. (See figure 17.) It is the duty of the fog lookouts to stand a vigilant watch and to detect and report everything within sight or hearing. A lookout's hearing must not be impaired by S/P telephones. Accordingly, the lookout is assisted by a phone talker who is in direct or indirect communication with the OOD and the lookout talker/plotter in CIC. The fog or restricted-visibility lookout's sectors of responsibility are as follows:

FORWARD LOOKOUT: Stationed as far forward and as close to the waterline as possible. Sector extends 30° on each side of the bow (330° - 030°).

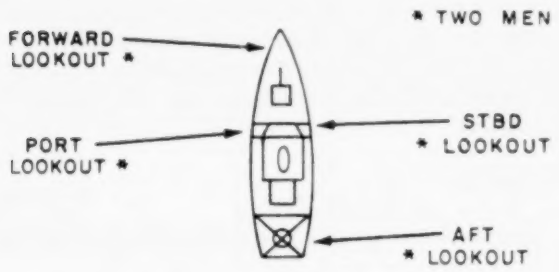


Figure 17.—Restricted-visibility stations.

STARBOARD LOOKOUT: Stationed on the starboard bridge wing. Sector extends from the forward lookout's boundary to the starboard beam (030° - 090°).

AFT LOOKOUT: Stationed as far aft and as close to the waterline as possible. Sector extends from the starboard beam clockwise to the port beam (090° - 270°).

PORT LOOKOUT: Stationed on the port bridge wing. Sector extends from the port bow to the forward lookout's boundary (270° - 330°).

During restricted-visibility conditions, conduct a moderately fast search without binoculars, but have them within reach in case the fog suddenly lifts.

SOUND SIGNALS

During restricted visibility, all ships continually sound fog signals in accordance with *Navigation Rules, International - Inland*. (See figure 18.) Most contacts will have to be reported by hearing prior to the actual sighting. Sounds that might be heard and must be reported are bell and whistle buoys, small craft motors, fog signals, wash of water on another ship's hull, and any other unusual sounds. You must constantly be alert and concentrate on the job at hand to hear these sounds.

REPORTS

Report sound signals using the following format.

1. WHAT IS HEARD: One prolonged blast, a rapid ringing bell, two short whistles, and so forth.

2. WHERE YOU HEAR IT: Use relative bearings. Be as accurate as possible.

3. SOUND STRENGTH: Weak, loud, or medium.

4. INTENSITY: Sound getting stronger, weaker, or remaining the same.

5. BEARING DRIFT: Sound is drifting from left to right, right to left, or remaining steady on same bearing.

The following is a sample of a sound signal report made by the forward lookout:

> ALL STATIONS—THIS IS FORWARD LOOKOUT—I HEAR TWO WEAK PROLONGED BLASTS—BEARING 015—WITH A RIGHT BEARING DRIFT.

SPECIAL SEA DETAIL

Whenever a ship gets under way from a pier or anchorage and goes to sea, or returns from sea to an anchorage or mooring, the special sea detail is set. Moving a ship in and out of crowded harbors is a big job that requires a lot of experience and skill. For that reason, the special sea detail is assigned to a special CIC team. Persons assigned to man the sea detail must be well-trained and know exactly what their assigned duties are.

PREPARATION

Preparations to enter or leave a harbor begin several hours before the special sea detail is actually set. There

SITUATION	SIGNAL	MAXIMUM INTERVAL
POWER-DRIVEN VESSEL U/W WITH WAY ON	—	2 MINUTES
POWER-DRIVEN VESSEL U/W BUT NO WAY ON	— —	2 MINUTES
VESSEL NOT UNDER COMMAND	— . .	2 MINUTES
VESSEL RESTRICTED IN ABILITY TO MANEUVER		
VESSEL CONSTRAINED BY ITS DRAFT		
SAILING VESSEL		
VESSEL ENGAGED IN FISHING		
VESSEL ENGAGED IN TOWING OR PUSHING ANOTHER VESSEL AHEAD		

Figure 18.—Fog signals; International and Inland.

SITUATION	SIGNAL	MAXIMUM INTERVAL
VESSEL TOWED	— . . .	2 MINUTES
VESSEL AT ANCHOR	X	1 MINUTE
ADDITIONAL SOUND SIGNAL THAT AN ANCHORED VESSEL MAY SOUND TO GIVE WARNING OF ITS POSITION	. — .	
VESSEL AGROUND	3 X 3	1 MINUTE
PILOT VESSEL WHEN E[illegible]GED ON PILOTAGE DUTY MAY GIVE ITS ADDIT[illegible]DENT[illegible] SIGNAL	. . . .	

are hundreds of things which must be done by different departments to ensure that the evolution is completed safely. Charts must be laid out and the ship's proposed track must be determined and plotted. Gyros must be tested, radio checks must be conducted, and so forth.

In addition to the duties of the regular underway lookout, the special sea detail lookout must perform additional duties. During sea detail the lookouts provide information to two separate groups—piloting and shipping. The piloting team is mainly concerned with navigating in and out of the harbor, while the shipping team is concerned with the surface contact picture. The piloting team ensures that the ship gets where it is supposed to go. The shipping team makes sure the ship does not hit anything on the way. The lookout has to provide the following information to each respective team:

Piloting Team

1. The port and starboard lookouts report buoys when they are first seen and exactly as they pass on the beam.

2. The forward lookout tells CIC when the bow of the ship is clear of the end of the pier.

3. When asked, all lookouts must be alert to give accurate bearings and ranges to geographic landmarks (bridges, lighthouses, and so forth).

Shipping Team

1. Be especially alert for small craft operating in the vicinity of the harbor.

2. Report all tugs upon sighting them.

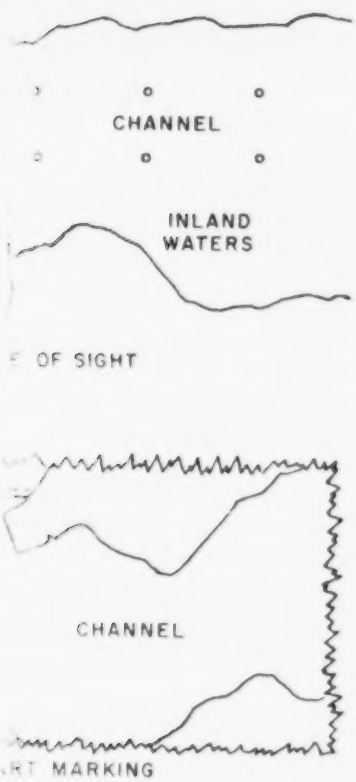
3. Report course and speed changes of ships as soon as possible.

Getting a large ship under way or bringing it to anchor can be a simple and quiet operation when all hands know their jobs and do them well.

RULES OF THE ROAD

Just as a driver must know traffic signals and laws governing speed, the crews who handle ships and boats must know the seagoing traffic rules. The nautical traffic rules are contained in *Navigation Rules* and are provided for a definite purpose—to prevent ship collisions. When collisions do occur, damage can run into many thousands of dollars, even if one or both ships do not sink. Even worse is the possibility that lives will be lost.

Rules of the Road are divided into two distinct sections: Inland Rules and International Rules. The boundaries that separate the areas where International Rules and Inland Rules apply are usually marked on each of the nautical charts. If the boundary lines are not marked on the chart, they may be drawn, as a general rule,



—Rule boundaries.

across the mouths of harbors, bays, and inlets. (See figure 19.)

INTERNATIONAL WHISTLE SIGNALS

International Rules of the Road must be obeyed by all public and private vessels of the United States navigating upon the high seas. These laws were established after a thorough study and an agreement made by most of the maritime nations of the world. These rules became effective for the United States after passage of an act of Congress. Most of the signals shown below are signals of execution. The first two are rudder signals to be given when actually changing course when another vessel is within sight.

A short blast is equal to about 1 second in duration; a prolonged blast, 4 to 6 seconds in duration.

Signal	Meaning
One short blast	I am altering my course to starboard
Two short blasts	I am altering my course to port
Three short blasts	I am operating astern propulsion
Five or more short blasts	Danger signal
One prolonged blast	I am approaching a blind bend in the channel

INLAND WHISTLE SIGNALS

Inland Rules of the Road are to be followed by all vessels navigating upon certain inland waters of the United States. The whistle signals listed below generally

are signals of intent. The first two signals must be answered by the other vessel in sight making the same signal before the proposed action is taken.

Signal	Meaning
One short blast	I propose a port-to-port passage
Two short blasts	I propose a starboard-to-starboard passage
Three short blasts	I am operating stern propulsion
Five or more short blasts	Danger signal
One prolonged blast	I am approaching a blind bend in the channel or leaving a pier

The "bend" signal is the only one made "blind." It is answered by the same signal by a ship around the bend. Then, when in sight, the danger signal, or a signal of proposal, is sounded, depending on circumstances. Remember, under International Rules, whistle signals generally are signals of execution or action; under Inland Rules they are signals of intent or proposal.

LIGHTS AND SHAPES

Navigation Rules states that all seagoing vessels must show certain lights from sunset to sunrise, whether at anchor or under way, and during daylight in restricted visibility. The basic purpose of these lights is to warn vessels of the presence of other vessels. Lights also aid in determining the course and aspect of vessels under way. In some cases, lights indicate a vessel which is restricted in its ability to maneuver, either because of physical characteristics or because of the activity in which it is engaged. The prescribed shapes serve the same purpose during the day. (See figure 20.)

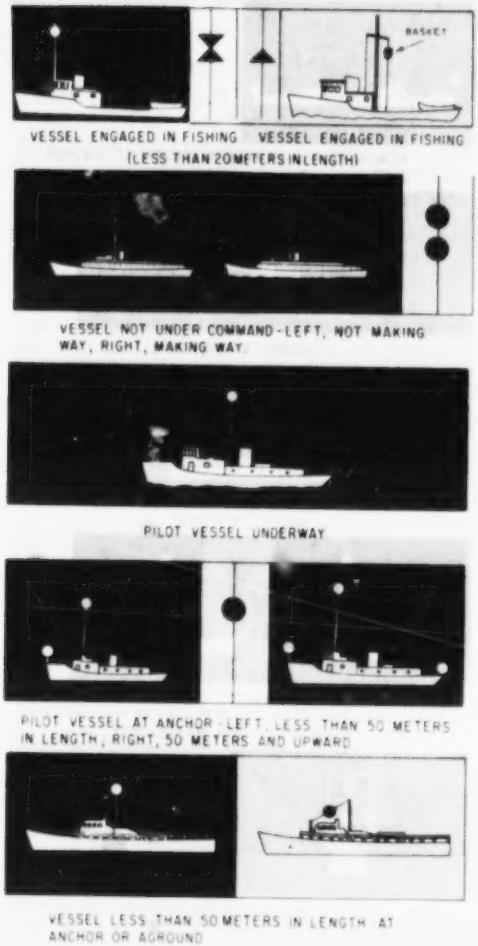

BASKET
VESSEL ENGAGED IN FISHING
VESSEL ENGAGED IN FISHING
(LESS THAN 20 METERS IN LENGTH)
VESSEL NOT UNDER COMMAND - LEFT, NOT MAKING WAY, RIGHT, MAKING WAY
PILOT VESSEL UNDERWAY
PILOT VESSEL AT ANCHOR - LEFT, LESS THAN 50 METERS IN LENGTH, RIGHT, 50 METERS AND UPWARD
VESSEL LESS THAN 50 METERS IN LENGTH AT ANCHOR OR AGROUND

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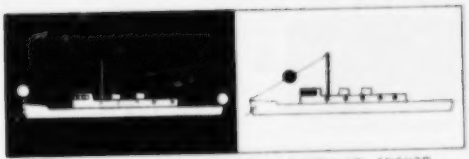
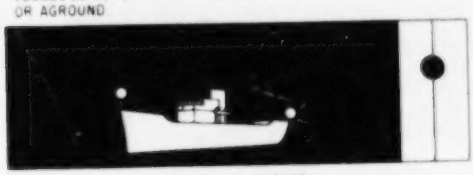
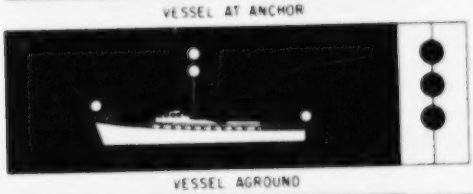
Figure 20.—Lights and shapes.



VESSEL 50 METERS AND UPWARD IN LENGTH AT ANCHOR OR AGROUND



VESSEL AT ANCHOR



VESSEL AGROUND

VESSEL RESTRICTED IN ABILITY TO MANEUVER (SPECIAL OPERATIONS), EXCEPT VESSEL ENGAGED IN MINESWEEPING LEFT, NOT MAKING WAY, RIGHT, MAKING WAY

VESSEL ENGAGED IN DREDGING OR UNDERWAY OPERATIONS, WHEN RESTRICTED IN ITS ABILITY TO MANEUVER, SHOWING CLEAR AND OBSTRUCTED SIDE

C282.14

Figure 20.--Lights and shapes—Continued.

RUNNING LIGHTS

All power-driven vessels are required to carry white, red, and green running lights when under way. (See figure 21.) Running lights consist of a white masthead light in the forward part of the ship (a second masthead light, abaft and higher than the forward one, is required on vessels 50 meters or more in length), sidelights (red on the portside, green on the starboard side), and a white stern light.

Running lights are fixed so they display an unbroken arc of light over certain portions of the horizon, making them readily identifiable. Running lights and their degree of arc are as follows:

Running Lights	Degree of Arc
Masthead light	225°
Sidelights	112.5°
Stern light	135°

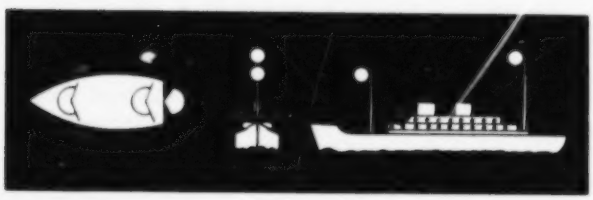


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Figure 21.—Running lights.

BUOYS

Buoys are moored floating markers placed so as to guide ships in and out of channels, warn them away from hidden dangers, and lead them to anchorage areas, etc. Buoys may be of various sizes and shapes. Regardless of their shapes, however, their distinctive coloring is the chief indication of their purposes.

Large automatic navigational buoys (LANBYs) are major aids to navigation, and they provide light, sound signal, and radio beacon service, much the same as lightships. Some LANBYs are replacing lightships in U.S. waters. The LANBY is an all steel disk-shaped hull 40 feet in diameter. The light, sound signal, and radio beacon are located on the mast.

Although buoys are valuable aids to navigation, they must never be depended upon exclusively. Buoys frequently drag their moorings in heavy weather, or they may be set adrift when run down by passing vessels. Lights on lighted buoys may go out of commission. Whistles, bells, and gongs actuated by the sea's motions may fail to function in smooth water.

INTERNATIONAL BUOYAGE REGIONS

To reach agreement with all maritime countries to bring all buoyage into one system with the least amount of money and time expended, two international buoyage regions were established. Figure 22 outlines International Buoyage Regions A and B. Navigational charts produced and/or printed after 1983 should indicate the buoyage region to which the chart refers.

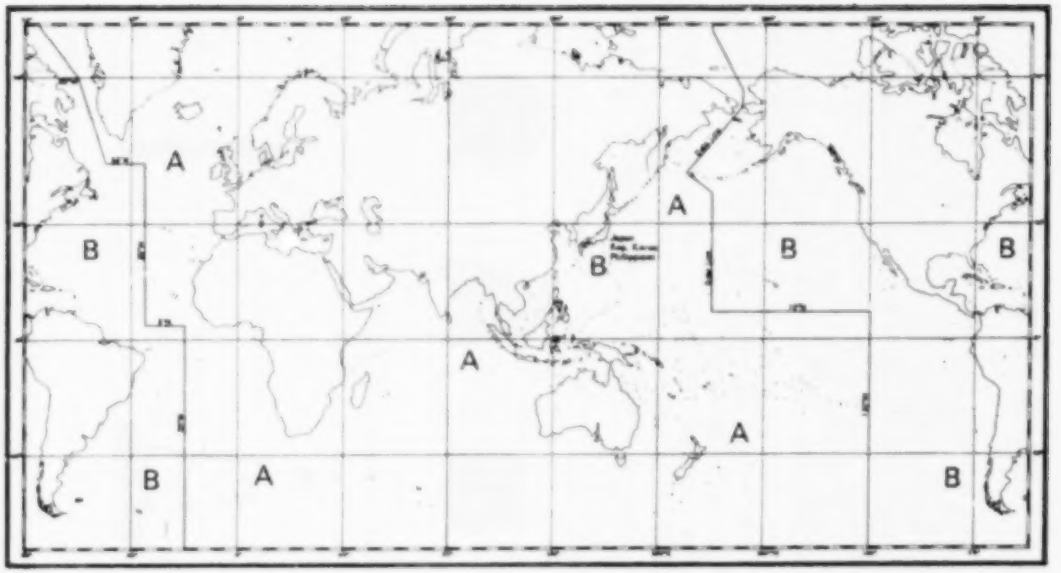

Figure 22.—IALA Maritime Buoyage System; buoyage regions A and B.

MARITIME BUOYAGE SYSTEM

Until recently, as many as 30 different buoyage systems were in use around the world. In 1982, most of the maritime nations of the world signed an agreement sponsored by the International Association of Lighthouse Authorities (IALA). This agreement adopted a system known as the IALA Maritime Buoyage System and provides rules that apply to all fixed and floating marks other than lighthouses, sector lights, range lights, lightships, and large automatic navigational buoys (LANBYs).

The Maritime Buoyage System provides five types of marks that may be used in any combination. The five types of marks are lateral, cardinal, isolated

Figure 23.—Basic buoy shapes.

danger, safe water, and special. Each will be discussed briefly here.

1. Lateral marks—indicate the port and starboard hand sides of channels. Within the Maritime Buoyage System there are two international buoyage regions where lateral marks differ.
2. Cardinal marks—used in conjunction with the compass, indicate that the navigable water lies to the named side of the mark.
3. Isolated danger marks—erected on, or moored directly on or over, dangers of limited size.
4. Safe water marks—used to indicate that there is water safe for navigation all around the position (examples: midchannel and fairways).
5. Special marks—call attention to an area or specific feature. Explanation of special marks may be found on the navigational chart you are using, in *Sailing Directions*, or in *Coast Pilots*.

MEANING OF DISTINGUISHING MARKS

The meaning of the mark depends upon one or more of the following features:

1. By day—color, shape, and topmark
2. By night—light color and phase characteristics

Color

The colors used for lateral marks in Region A are red, green, green with one red horizontal band, and red with one green horizontal band.

The colors used for lateral marks in Region B are green, red, red with one green horizontal band, and green with one red horizontal band.

Shape

There are five basic buoy shapes (fig. 23); can, nun, spherical, pillar, and spar. With the exception of pillar

and spar buoys, the shape of the buoy indicates the correct side on which to pass. Can buoys may sometimes be referred to as cylindrical and nun buoys referred to as conical. The term *pillar* is used to describe any buoys that is smaller than a lighthouse buoy and that has a tall, central structure on a broad base. Lighted buoys in the United States are referred to as pillar buoys.

Topmarks

The IALA Maritime Buoyage System makes use of can, nun, spherical, and X-shaped topmarks only. Topmarks on pillar and spar buoys are particularly important to indicate the side on which they will be passed and will be used wherever practical.

Lights

Where marks are lighted, red and green lights are reserved for port and starboard or starboard and port lateral marks. Yellow lights are for special marks, and white lights are used for other types of marks.

Phase Characteristics

Lights, when fitted, may have any of the following phase characteristics (or frequency of

duration): flashing, quick flashing, very quick flashing, long flashing, composite group flashing, group flashing, isophase or occulting.

SHIP RECOGNITION AND IDENTIFICATION

As stated earlier, sighting contacts and reporting them to the bridge and CIC are the primary duties of the lookout. However, your job as lookout does not end there: the contact must be identified. Ships normally should be identified while they still are distant enough to present only a silhouette to the observer. The types/classes of ships can be determined from silhouettes long before their hull numbers or names can be distinguished. (See figures 24 and 25.) The first determination to be made is whether a vessel is a merchant (civil) or naval ship. Visual identifications will be plotted and logged in CIC so it is important for you to be able to recognize a friend or foe quickly and accurately. If you do not know the exact identity of the contact, the thing to do is to describe it. The following guidelines will help in ship recognition.

MERCHANT SHIPS

All merchant ships can be placed into one of five basic design groups, depending on the location and

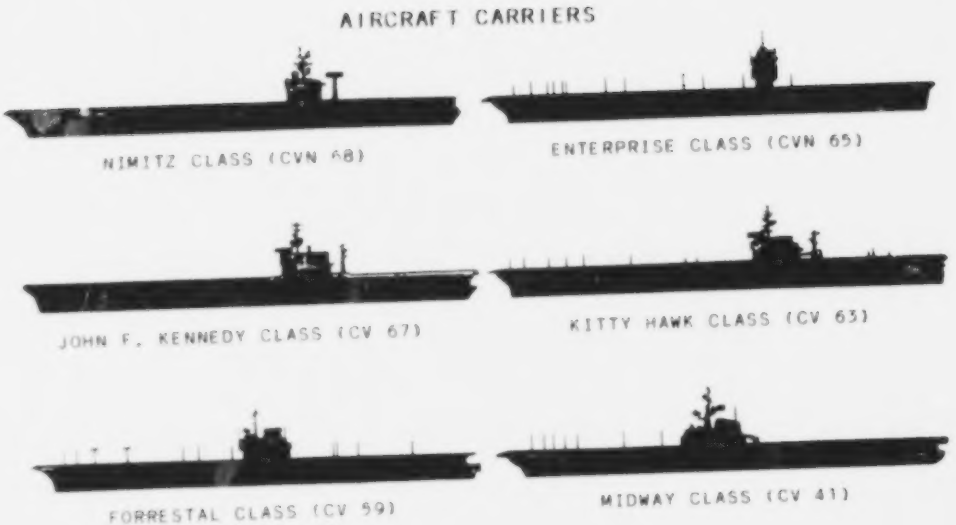
AIRCRAFT CARRIERS
NIMITZ CLASS (CVN 68)
ENTERPRISE CLASS (CVN 65)
JOHN F. KENNEDY CLASS (CV 67)
KITTY HAWK CLASS (CV 63)
FORRESTAL CLASS (CV 59)
MIDWAY CLASS (CV 41)

Figure 24.—Silhouettes of U.S. Navy ship types.

Figure 24.—Silhouettes of U.S. Navy ship types—Continued.

Figure 24.—Silhouettes of U.S. Navy ship types—Continued.

AMPHIBIOUS WARFARE SHIPS
WASP CLASS (LHD 1)
TARAWA CLASS (LHA 1)
IWO JIMA CLASS (LPH 2)
CHARLESTON CLASS (LKA 113)
BLUE RIDGE CLASS (LCC 19)
NEWPORT CLASS (LST 1179)

Figure 24.—Silhouettes of U.S. Navy ship types—Continued.

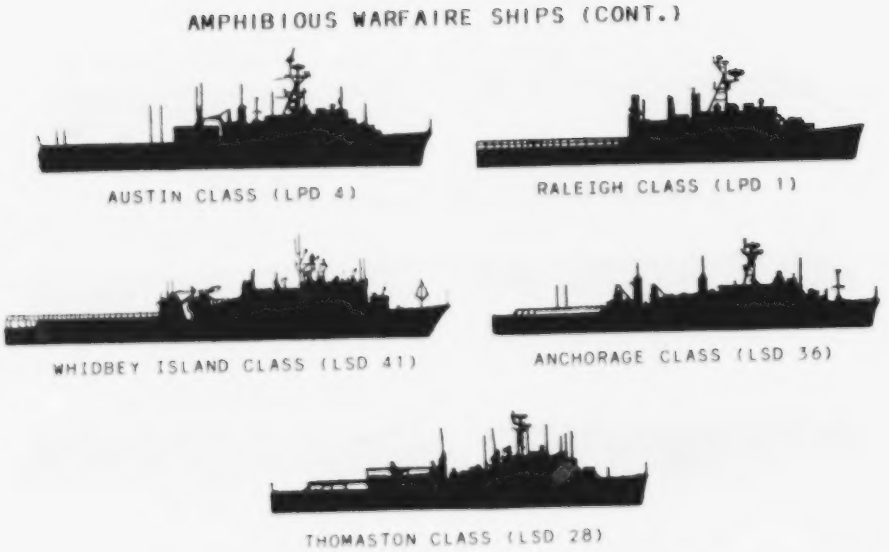
AMPHIBIOUS WARFAIRE SHIPS (CONT.)
AUSTIN CLASS (LPD 4)
RALEIGH CLASS (LPD 1)
WHIDBEY ISLAND CLASS (LSD 41)
ANCHORAGE CLASS (LSD 36)
THOMASTON CLASS (LSD 28)

Figure 24.—Silhouettes of U.S. Navy ship types—Continued.

SUBMARINES

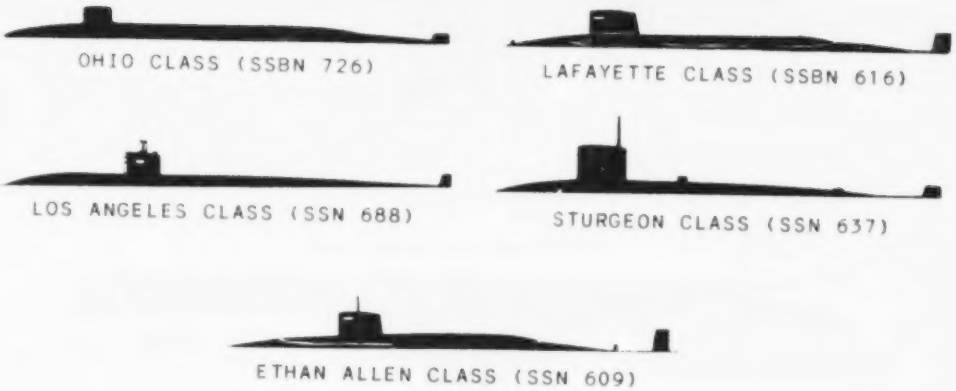

Figure 24.—Silhouettes of U.S. Navy ship types—Continued.

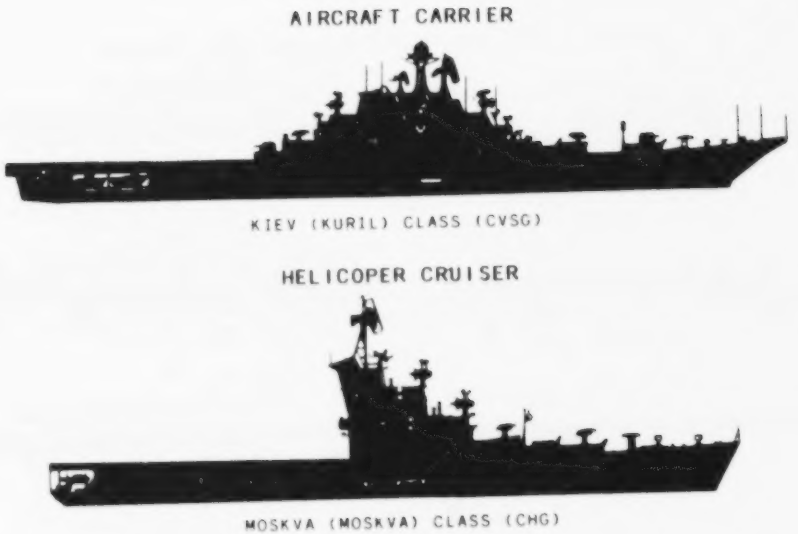

Figure 25.—Silhouettes of Soviet warship classes.

Figure 25.—Silhouettes of Soviet warship classes—Continued.

Figure 25.—Silhouettes of Soviet warship classes—Continued.

FRIGATES

Figure 25.—Silhouettes of Soviet warship classes—Continued.

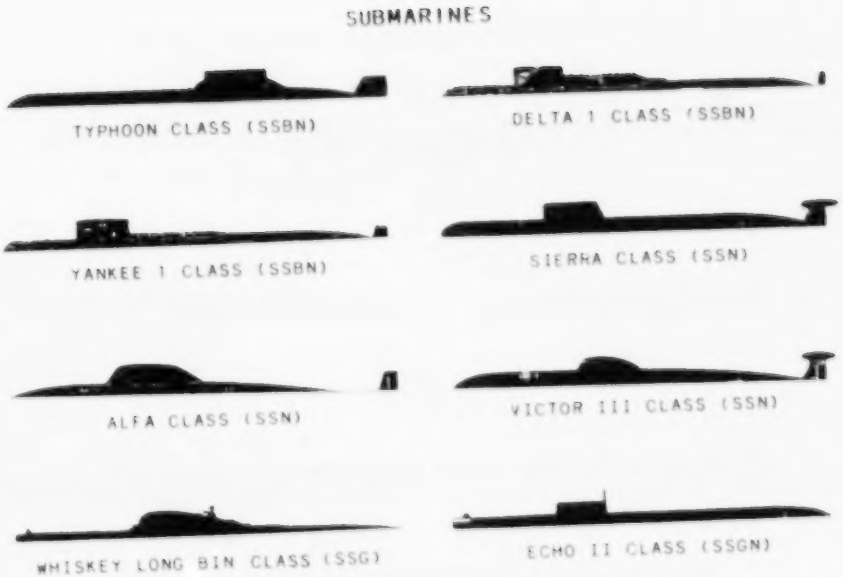

Figure 25.—Silhouettes of Soviet warship classes—Continued.

Figure 25.—Silhouettes of Soviet warship classes—Continued.

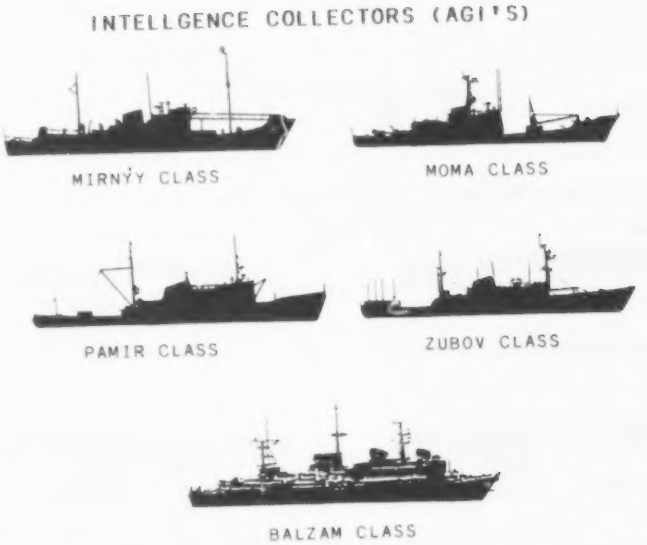

Figure 25.—Silhouettes of Soviet warship classes—Continued.

shape of the superstructure, location of the stack, and length of the ship. (See figure 26.)

1. TANGO class (transport). Passenger ships or passenger/cargo ships have the superstructure extending more than one-third the overall length of the ship.

2. FOXTROT TANGO class (freighter transport). Normally includes vessels used for a combination of passenger and cargo transports. They have a block superstructure amidships that is less than one-third the length of the ship.

3. FOXTROT class (freighter). Primarily a cargo type that has the superstructure amidships and a distinct separation between funnel and bridge.

4. SIERRA class (stack aft). Cargo vessels or tankers that have the superstructure located entirely in the after one-third section of the vessel.

5. NOVEMBER class (miscellaneous). Fishing trawlers, tugs, coastal passenger steamers, junks, and sampans.

DISTANT VIEW

The appearance of smoke on the horizon may often be the first indication of the presence of a ship. As the

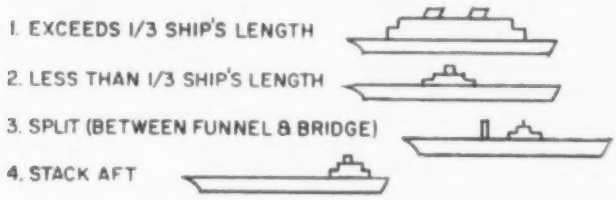

Figure 26.—Superstructure group.

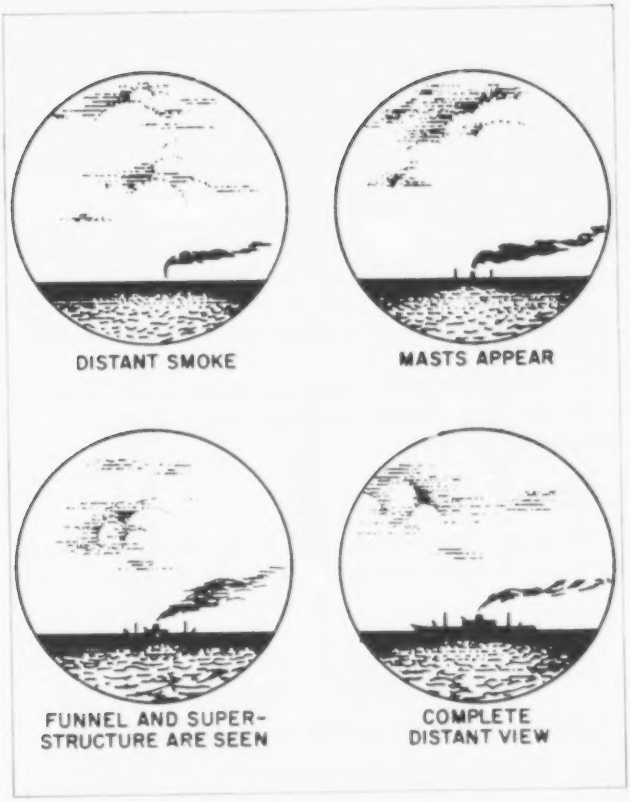

Figure 27.—Distant view.

distance between the observer and the ship decreases, other features appear until a complete distant view is possible. Actual first sighting of the vessel will be of masts, kingposts, funnels, and superstructure because the ship will be hull down. The vessel must then be studied according to a definite plan. The most obvious method is to start forward and work aft noting the prominent features in sequence, as listed below. (See figure 27.)

1. Masts
2. Funnels
3. Kingposts
4. Cranes

Hull Design

It is unlikely that the hull will be sufficiently distinct at a distance to enable an accurate initial report to be made. However, once the vessel is well above the horizon, distinctive features begin to appear, such as stems and sterns. These features can be added to your amplifying report. By numbering the castles from forward to aft, as in figure 28, an indication of the hull form can be given. For example, a three-island ship is described as having hull form 1-2-3, and ships that have no raised castles are classed as flush-decked vessels.

For recognition purposes bows and sterns are grouped into three designs, although there are

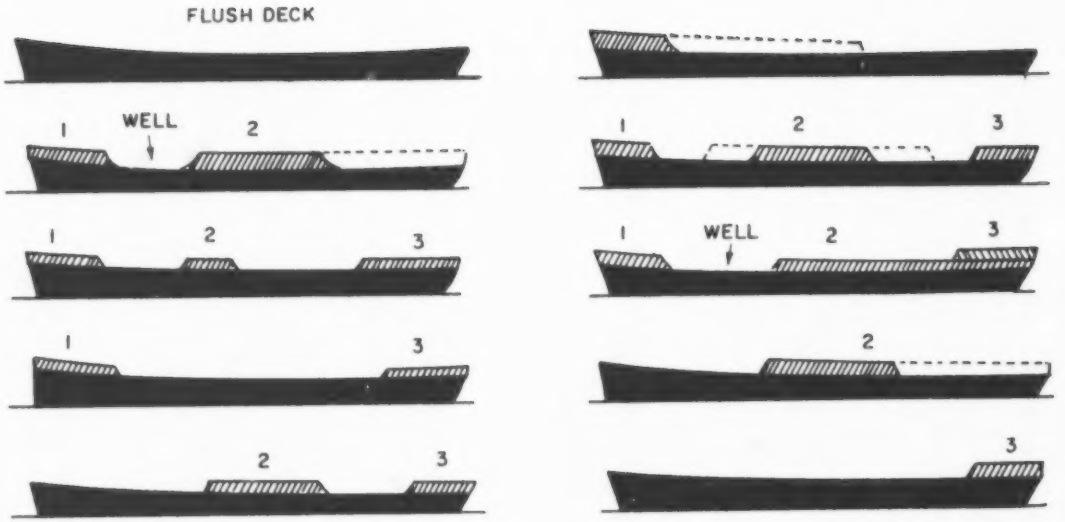

Figure 28.—Basic hull designs.

variations or modifications of most of them. (See figures 29 and 30.)

Bow Types:

1. Straight plumb or vertical. The oldest type, it offers the most resistance to the sea.

2. Raking or sloping, and curved and raking. Angle varies greatly. Clipper or cable bows come within this group.

3. Maier. An outward curve, all rounded and not "sitting" on the water.

STRAIGHT, PLUMB OR VERTICAL

RAKING OR SLOPING

CURVED AND RAKING

MAIER

Figure 29.—Bow designs.

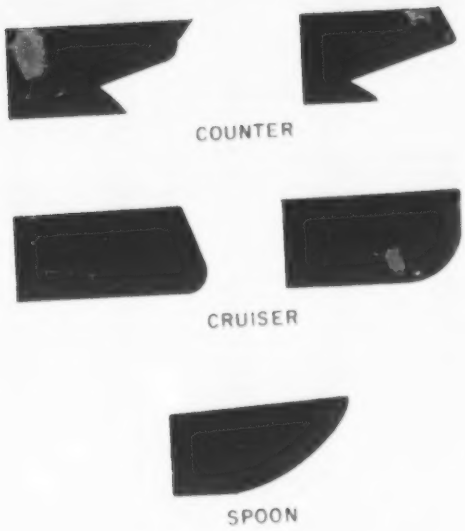

Figure 30.—Stern designs.

Stern Types:

1. Counter. The stern is hooked and curved inward.
2. Cruiser. The stern is butted and straight, rounding only at the bottom.
3. Spoon. The stern is angled greatly. A particular feature of German- or Russian-built ships.

Armament

An indication of the merchant/naval character of a vessel is the presence of visible weapons. The absence of guns may have little significance, but their presence

almost certainly indicates a naval vessel. You should start forward and work aft (see figure 31) to identify the following armament:

1. Guns
2. Missiles/directors
3. ASROC
4. Torpedoes
5. Depth charges
6. Aircraft and helicopters on board

AIRCRAFT RECOGNITION AND IDENTIFICATION

The different types of aircraft presently in use by military and naval powers are so numerous that only

Figure 31.—Ship armament.

an expert can be expected to know and recognize them all. Bombers, fighters, fighter-bombers, and reconnaissance planes may be propeller-driven or jet, single- or multi-engine, straight-wing, delta-wing, swept-wing, or combinations of these, and various other descriptions.

Instruction in identification of aircraft should consist primarily of classroom lectures, slides, and motion pictures, together with on-the-job instruction when aircraft are operating in the ship's vicinity.

With each advance in aeronautical engineering and design, aircraft are able to fly higher and faster. High-speed characteristics tend to make aircraft of different nations look very much alike, thus increasing the difficulty of in-flight identification. For the foregoing reasons, shipboard recognition training should stress ability to recognize aircraft likely to be seen in a local rather than a worldwide area of deployment. Determination of the friendly or unfriendly character of aircraft is a prime function of the ship's installed IFF system, which can be used to interrogate aircraft long before the craft are within visual range. Exact names and designations may prove unimportant but personnel should be taught to distinguish between the various classes of aircraft—bombers, fighters, reconnaissance, transport, pilotless, and so forth.

Airplanes, like automobiles and people, do differ, and their underlying differences can be detected. Basic aircraft recognition features follow:

1. Fuselage. The fuselage is the main body of the aircraft where all equipments required for control are located and to which the wings and tail units are attached. The foremost part of the fuselage is the nose. Various types of fuselages are shown in figure 32.

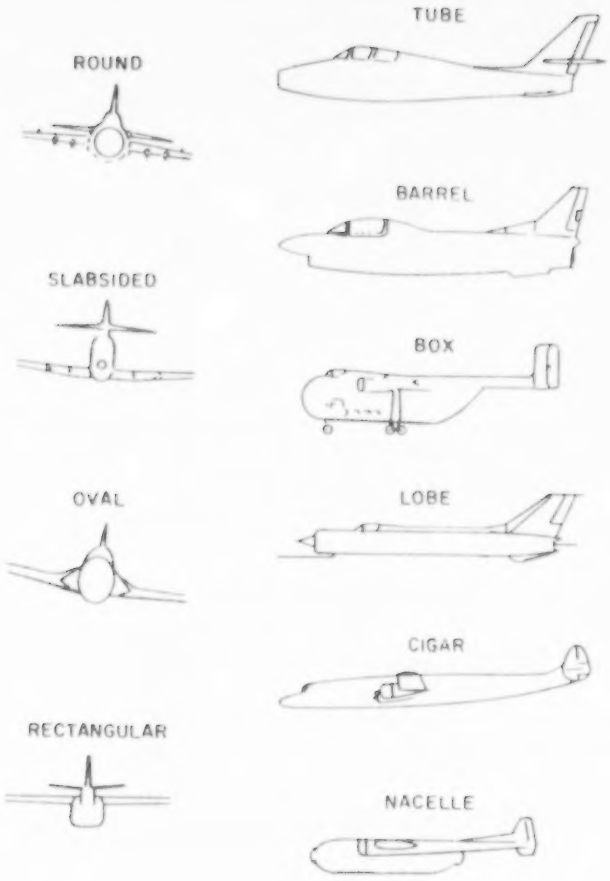

Figure 32.—Fuselage types.

2. Wing. The main supporting surface, or airfoils, of an airplane are the wings. Figure 33 shows the most common wing types and positions. The type and degree of wind dihedral angle are shown in figure 34.

3. Tail. The tail is the after part of an aircraft and generally consists of stabilizers, elevators, fin, and

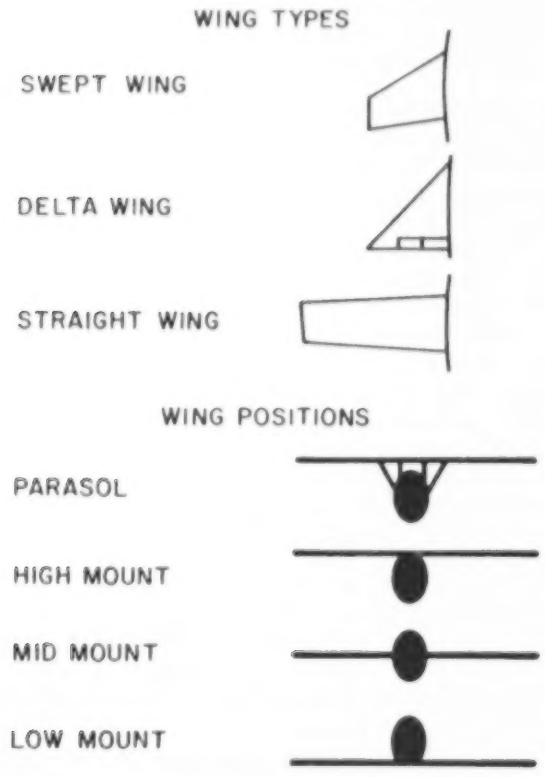

Figure 33.—Wing types and positions.

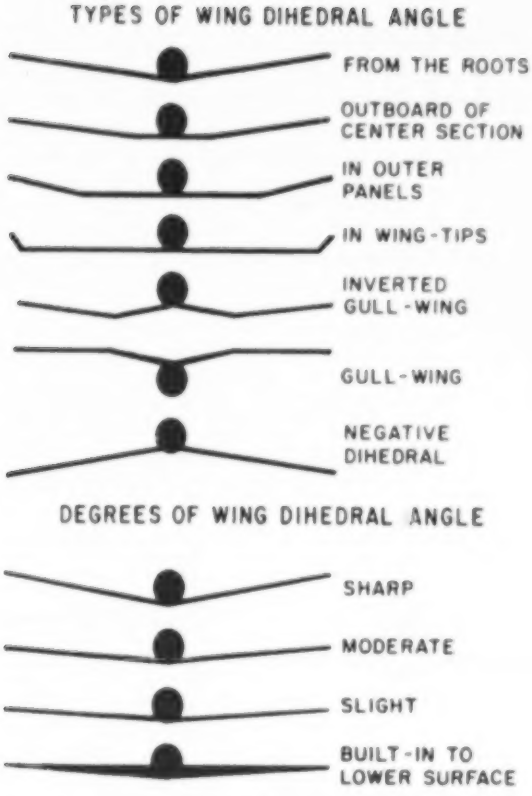

Figure 34.—Wing dihedral angle.

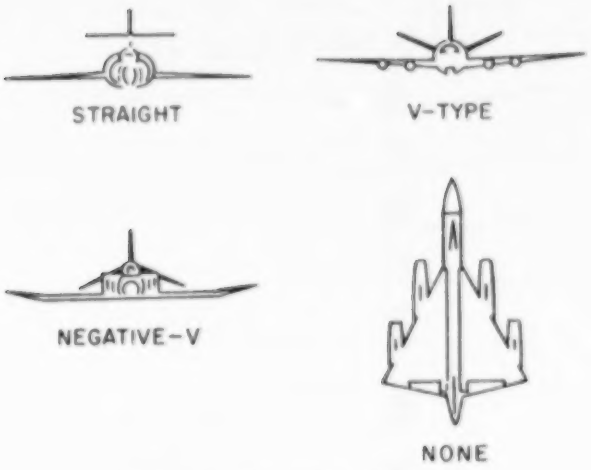

Figure 35.—Horizontal stabilizers.

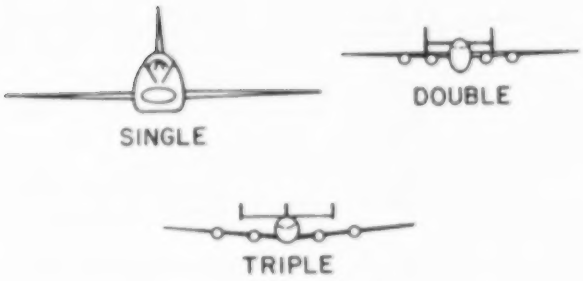

Figure 36.—Vertical stabilizers.

rudder. See figures 35 and 36 for the various types of horizontal and vertical stabilizers of the tail assembly.

SUMMARY

An alert, proficient lookout team is a vital asset to the safety of ship and crew. Many nautical disasters have been avoided because of a vigilant lookout; many have occurred because there was no proper lookout. You can clearly see how important the lookout is as part of the ship's operating team.

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